



Title of Invention: RUSH HOUR MODELING FOR ROUTING AND SCHEDULING

Inventor(s) Name: Heaps, et al.

Application No.: 10/828,850

Attorney Docket No.: 018360.260844

REPLACEMENT SHEETS

**SAMPLE SET OF MODIFIED RUSH HOUR TRAVEL SPEEDS**

<b>GEOGRAPHIC AREA/ROAD SEGMENT</b>	<b>NORMAL TRAVEL SPEED</b>	<b>TRAVEL SPEED DURING TIME WINDOW #1</b>	<b>TRAVEL SPEED DURING TIME WINDOW #2</b>	<b>TRAVEL SPEED DURING TIME WINDOW #3</b>
<b>ROAD 1 IN AREA 1</b>	<b>45 mph</b>	<b>31.5 mph (30% SLOWER)</b>	<b>36 mph (20% SLOWER)</b>	<b>31.5 mph (30% SLOWER)</b>
<b>ROAD 2 IN AREA 1</b>	<b>50 mph</b>	<b>35 mph (30% SLOWER)</b>	<b>40 mph (20% SLOWER)</b>	<b>35 mph (30% SLOWER)</b>
<b>ROAD SEGMENT X</b>	<b>30 mph</b>	<b>20 mph (30% SLOWER)</b>	<b>0 mph (TRAVEL RESTRICTION)</b>	<b>20 mph (30% SLOWER)</b>
<b>ROAD SEGMENT Y</b>	<b>65 mph</b>	<b>45.5 mph (30% SLOWER)</b>	<b>0 mph (TRAVEL RESTRICTION)</b>	<b>45.5 mph (30% SLOWER)</b>
<b>ALL AREAS AND ROADS TO WHICH NO NEW TRAFFIC RULES WERE DEFINED TO APPLY.</b>	<b>NORMAL SPEED</b>	<b>NORMAL SPEED</b>	<b>NORMAL SPEED</b>	<b>NORMAL SPEED</b>

**FIG. 1**

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TRAVEL MATRIX FOR "NORMAL" TRAFFIC CONDITIONS

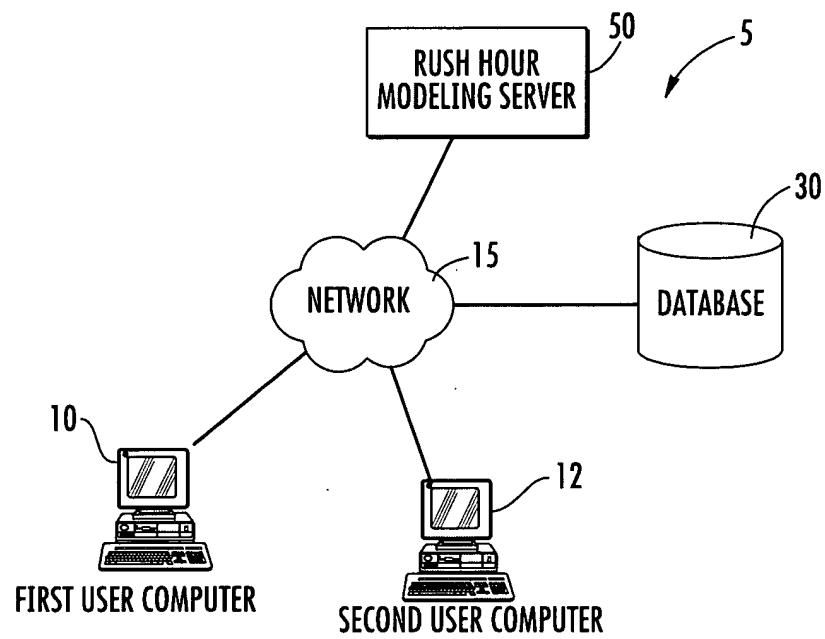
	LOCATION 1	LOCATION 2	LOCATION 3	LOCATION 4
LOCATION 1	----	10 minutes	15 minutes	20 minutes
		2 miles	3 miles	4 miles
LOCATION 2	10 minutes	----	5 minutes	10 minutes
	2 miles		1 mile	2 miles
LOCATION 3	15 minutes	5 minutes	----	5 minutes
	3 miles	1 mile		1 mile
LOCATION 4	20 minutes	10 minutes	5 minutes	----
	4 miles	2 miles	1 mile	

FIG. 2A

TRAVEL MATRIX FOR A PARTICULAR TIME WINDOW  
WITH A 20% SLOWER SPEED VARIATION

	LOCATION 1	LOCATION 2	LOCATION 3	LOCATION 4
LOCATION 1	----	15 minutes	18 minutes	24 minutes
		3 miles	3 miles	4 miles
LOCATION 2	15 minutes	----	6 minutes	15 minutes
	3 miles		1 mile	2 miles
LOCATION 3	18 minutes	6 minutes	----	6 minutes
	3 miles	1 mile		1 mile
LOCATION 4	24 minutes	15 minutes	6 minutes	----
	4 miles	2 miles	1 mile	

FIG. 2B



**FIG. 3**

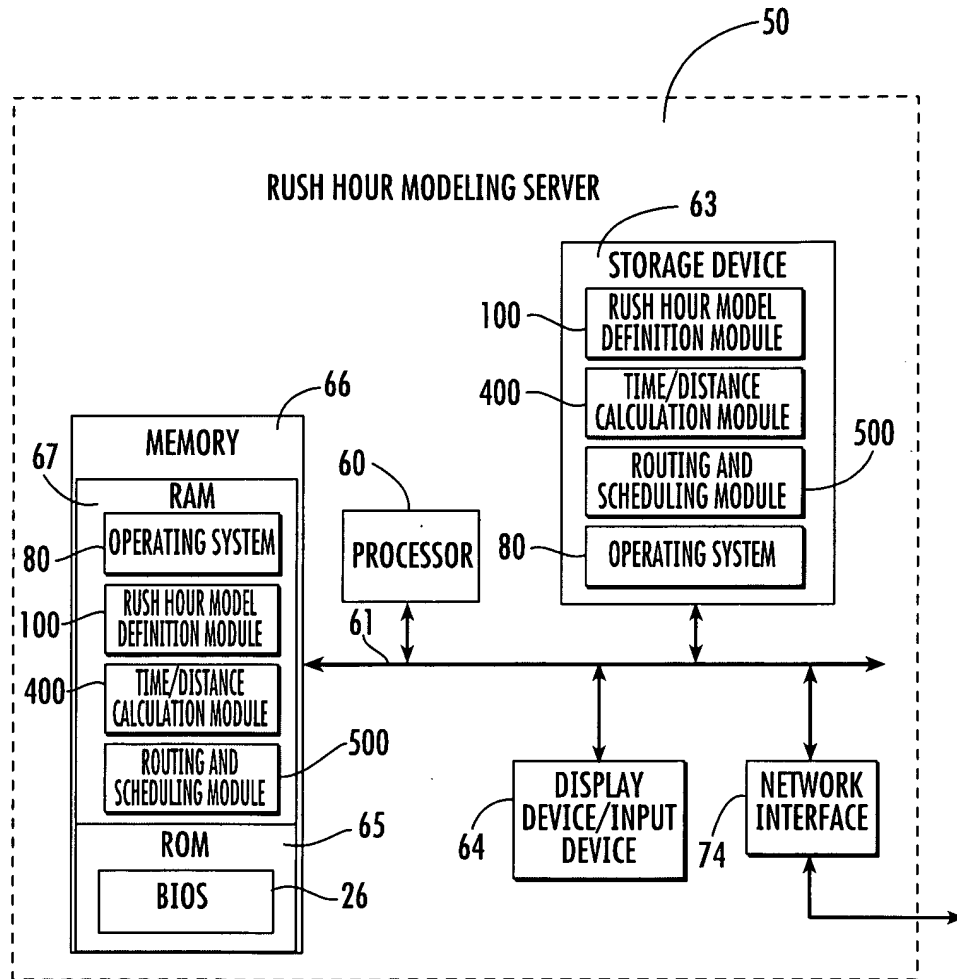
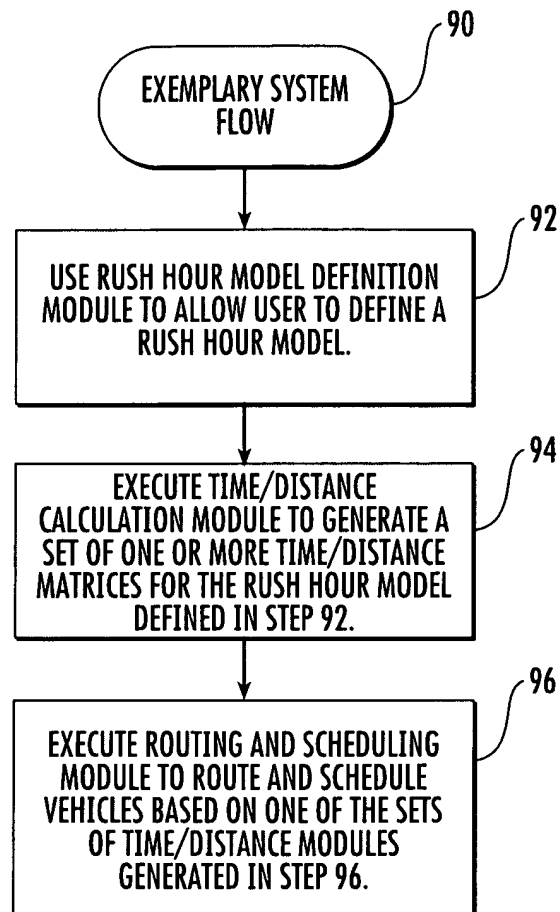
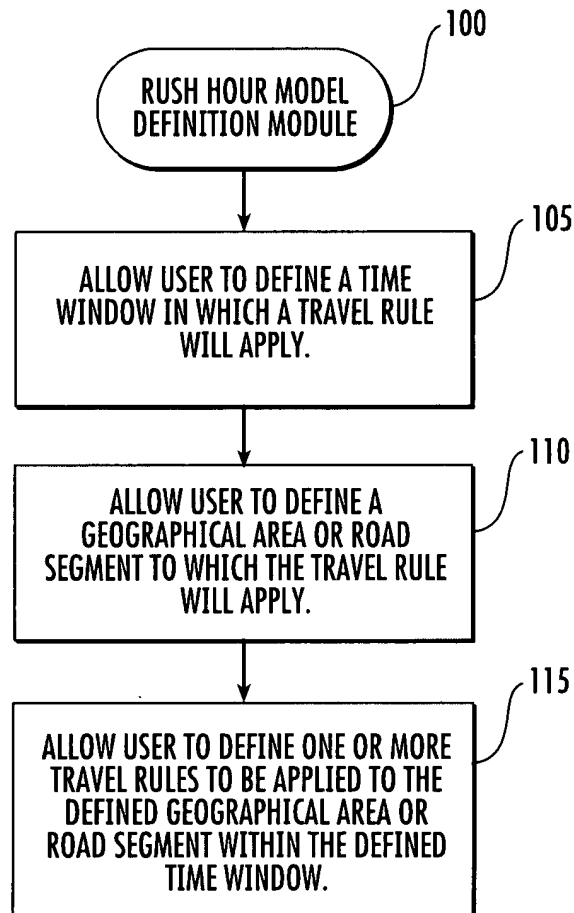


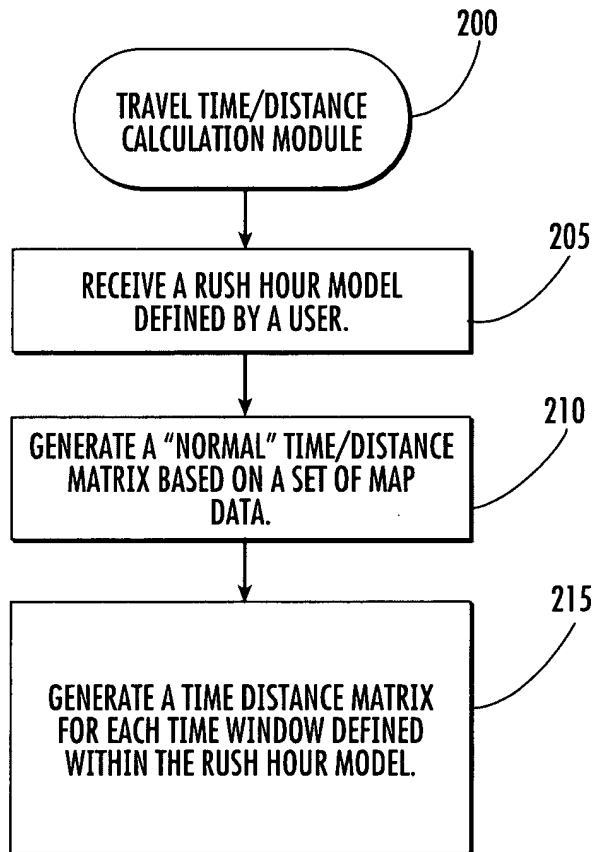
FIG. 4



**FIG. 5**



**FIG. 6**



**FIG. 7**

☒ EDIT RUSH HOUR MODEL/1 OF 1 RECORD(S) [?] [X]

Name **602** Description **604**

Summer Summer rush hour in central MD

**606** Time Period 1

☒ Enable

Name **608** Start **610** End **612** Global Speed Variation

Morning 6:00 9:00 ☒ 15 % ☐ Faster ☒ Slower **618**

**614** **616**

Time Period 2

☐ Enable

Name Start End Global Speed Variation

Midday 11:00 13:00 ☒ 0 % ☐ Faster ☒ Slower

Time Period 3

☒ Enable

Name Start End Global Speed Variation

Afternoon 16:00 19:00 ☒ 25 % ☐ Faster ☒ Slower

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FIG. 8



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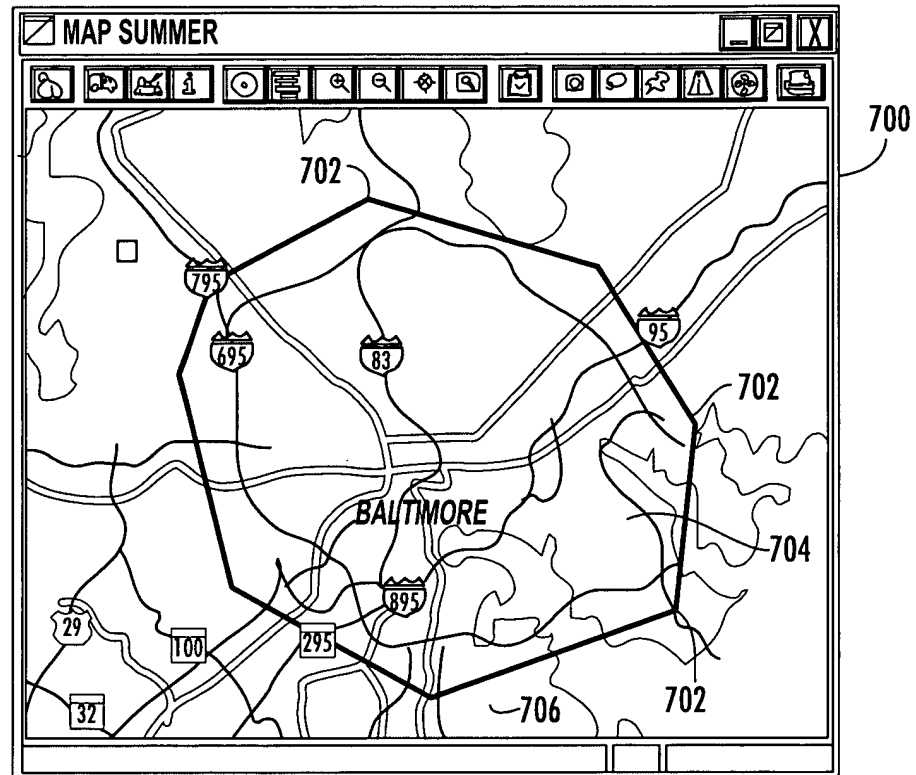


FIG. 9

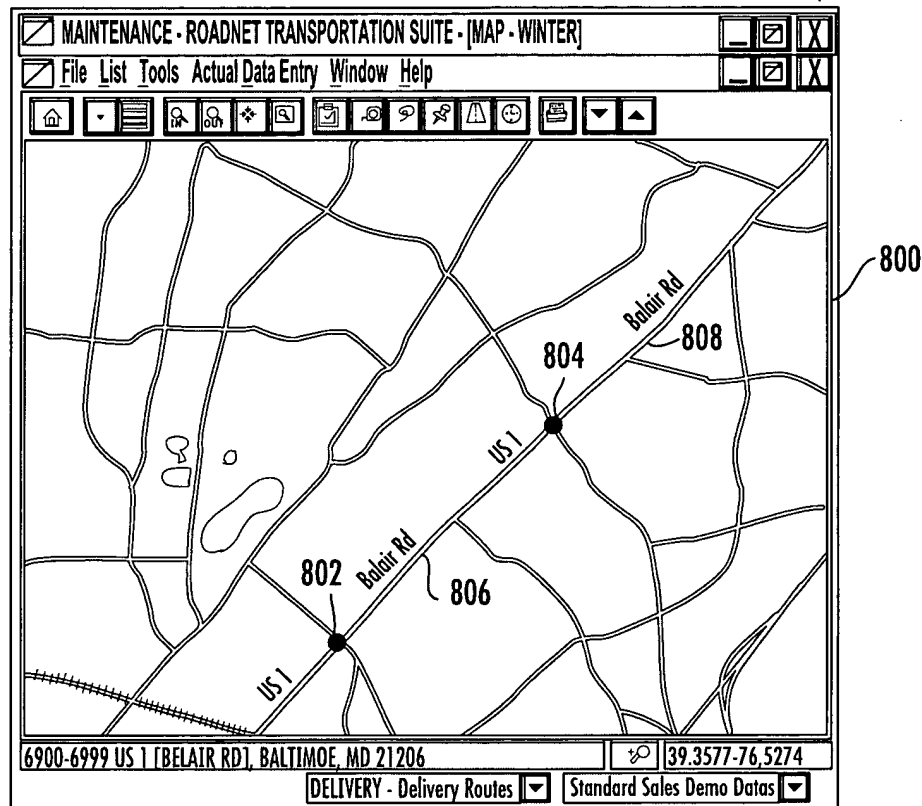


FIG. 10

**RUSH HOUR AREA ATTRIBUTES-WINTER**

Name **902** Description **916** Priority **900**

Baltimore Metro Baltimore 1

☒ Simple **905** ☐ Advanced **914**

**904** SPEED VARIATION ADVANCED SPEED VARIATION TRAVEL RESTRICTION

<b>906</b>	Time Period 1	Time Period 2	Time Period 3
	06:00 - 09:00	16:00 - 19:00	Not Enabled

SPEED VARIATION

<input checked="" type="checkbox"/> 40 % <input type="radio"/> Faster <input checked="" type="checkbox"/> 35 % <input type="radio"/> Faster <input type="checkbox"/> 0 % <input type="radio"/> Faster	<input checked="" type="radio"/> Slower <input type="radio"/> Slower <input type="radio"/> Slower
---	---

**908** **910** **912**

OK CANCEL

FIG. 11

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☒ RUSH HOUR AREA ATTRIBUTES-WINTER

Name:  Description:  Priority:

☐ Simple ☒ Advanced

☐ SPEED VARIATION ☒ ADVANCED SPEED VARIATION ☐ TRAVEL RESTRICTION

	Time Period 1 Not Enabled	Time Period 2 16:00 - 19:00	Time Period 3 Not Enabled
Interstate	<input checked="" type="checkbox"/> 45 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 40 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
Primary	<input checked="" type="checkbox"/> 30 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 03 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
Secondary	<input checked="" type="checkbox"/> 20 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 20 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
Local	<input checked="" type="checkbox"/> 10 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 10 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower

OK CANCEL

FIG. 12

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☒ RUSH HOUR PATH ATTRIBUTES-WINTER

Name	Description
I-795	I-795 WEST

Morning 06:00 - 09:00 1104    Midday Not Enabled    Afternoon 16:00 - 19:00

SPEED VARIATION

<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 30 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
---	---	---

TRAVEL RESTRICTION

<input type="checkbox"/> Restricted	<input checked="" type="checkbox"/> Restricted 1106	<input type="checkbox"/> Restricted 1108
-------------------------------------	---	--

TRAVEL DIRECTION


<input checked="" type="radio"/> No Change <input type="radio"/> Both Ways <input type="radio"/> One Way: A to B <input type="radio"/> One Way: B to A	<input checked="" type="radio"/> No Change <input type="radio"/> Both Ways <input type="radio"/> One Way: A to B <input type="radio"/> One Way: B to A	<input checked="" type="radio"/> No Change <input type="radio"/> Both Ways <input type="radio"/> One Way: A to B <input type="radio"/> One Way: B to A
---	---	---

OK CANCEL

FIG. 13

1200

☒ EDIT EQUIPMENT TYPE / 1 OF 1 RECORD(S) ? X

 1201

General **Fleetloader**

Type ID  Description **1204**

General Info

Weight	Height
<input type="text" value="0.0000"/>	<input type="text" value="9,999.9999"/>

Cost Info

Fixed	Variable
<input type="text" value="0.0010"/>	<input type="text" value="1.0000"/>

1206

1212

Sizes	Frozen	Dry	Refrig
Cases <input type="text" value="500"/>	<input type="text" value="1"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Weight <input type="text" value="500"/>	<input type="text" value="2"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Cube <input type="text" value="12,500"/>	<input type="text" value="3"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

☒ Prohibited from Restricted Rush Hour Areas and Paths

1210

Ready Modified by ADMIN on 4/25/2000 23:24

FIG. 14

☒ RUSH HOUR AREA ATTRIBUTES-WINTER

Name

Metro Baltimore

Description

Area enclosing Balt. Beltway

Priority

0

☐ Simple

☒ Advanced

SPEED VARIATION

ADVANCED SPEED VARIATION

TRAVEL RESTRICTION

Road Class

Interstate

Primary

Secondary

Local and Ramps

Morning  
06:00 - 09:00

Midday  
Not Enabled

Afternoon  
16:00 - 19:00

☐ Restricted

☒ Restricted

☒ Restricted

☒ Restricted

☐ Restricted

☐ Restricted

☐ Restricted

☐ Restricted

☐ Restricted

☒ Restricted

☒ Restricted

☒ Restricted

OK

CANCEL

CANCEL

1312

A check on this page means restricted equipment types cannot use roads of that class during the time period

OK

CANCEL

FIG. 15

1400

☒ EDIT ROUTING SESSION / 1 OF 1 RECORD(S) [?] [X]

Planned Delivery Date: 2/7/2003 [v]  
Scenario: DELIVERY [v] 1404

Description: Delivery 1406

1402

Time/Distance Calculation

1408

☐ XY  
☐ Use Barrels  
☒ RouteNet  
☒ Advanced Rush Hour (consider alternative streets)  
Rush Hour Model: Winter [v] 1410

☒ Combine Orders  
☐ DOT Tracking

Valid Delivery Days

1414

M T W R F S U  
☒ ☒ ☒ ☒ ☒ ☒ ☒

1412

Ready Modified by ADMIN on 2/8/2003 10:11

FIG. 16



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1500

Name	Description	Advanced	User Modified	Date Modified
Holiday	Rush hour for holidays	<input type="checkbox"/>	ADMIN	2/9/2003 19:46
Summer	Summer rush hour in central MD	<input type="checkbox"/>	ADMIN	2/9/2003 19:45
Winter	Winter rush hour in central MD	<input checked="" type="checkbox"/>	ADMIN	2/9/2003 19:44

3

FIG. 17